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Water Quality Impacts of MTBE: An Update Since the Release of the UC Report

Executive Summary

Occurrence of MTBE in Drinking Water in California. The UC report suggested that MTBE would contaminate a significant number of surface and ground water resources in California projected through the year 2010. Since 1998, several mitigation measures and a large amount of monitoring data indicate that future MTBE contamination of groundwater and surface waters in California is likely to be much less severe than predicted by the UC researchers. Recent monitoring data released by the California Department of Health Services (CalDHS) shows that MTBE detections in both surface water sources and public water supply wells have steadily decreased since 1998.

Declining Detections of MTBE in Groundwater from Public Water Supply Wells. At the time of publication of the UC report (1998), the number of MTBE detections in drinking water sources, both groundwater and surface water, was increasing fairly rapidly. Based on information available at the time, the UC report suggested that between 60 and 340 public drinking water wells would become contaminated by MTBE in the future, in addition to the 35 wells that had already been impacted for a total of about 100 to 400 public water supply (PWS) wells. In 1998, CalDHS monitored 2,988 public water supply wells for MTBE, representing 21% of the total public drinking water wells. Of these wells, 1.2% (35) contained detectable levels (greater than 1 to 5 ppb) of MTBE. The UC report therefore concluded that 1.2% of the entire population of untested wells could become contaminated in the future, using this as an upper bound estimate for future impacts of MTBE. in the absence of a ban on the use of the chemical. However, since 1998, and as more wells were tested. the percentage of newly contaminated wells decreased. For example. 7,981 sources were sampled in June 2001 and MTBE was only detected in 0.6 % of the wells tested. The percentage of new wells contaminated with MTBE between March 2000 and the present (June 2001) is 0.15 %. This number is approximately one order of magnitude lower than that used by UC researchers (1.2%). Using this new number, and assuming a total of 10,931 unsampled active public water supply wells in California, only 16 new wells are projected to be impacted compared to the UC estimate of 60 to 340 wells.

In addition, the UC report suggested that MTBE plumes will generally grow in length three to four-fold by 2010 compared to plume sizes in 1998 and could extend up to 7000 feet from the release points to impact a volume of groundwater over 100,000 acre-ft. This analysis also assumed that these plumes would not be actively remediated by responsible parties and that MTBE does not naturally biodegrade. Since 1998. MTBE has been shown to biodegrade under a

range of environmental conditions, both in laboratory samples and in the field. Several studies of MTBE plumes from other states suggest that many plumes are stabilizing and are not likely to expand indefinitely. In addition, for those MTBE plumes posing significant threats to groundwater supplies, active remediation is being initiated by responsible parties. Thus, the total volume of groundwater predicted by the UC Report substantially overestimates the probable future impacts.

Declining Detections of MTBE in Surface Water. The UC report suggested that surface water resources used as motorized recreational areas and drinking water sources would require treatment for removal of MTBE. Since 1998, the continued phase-out of two-stroke engines on many of California's drinking water reservoirs has greatly reduced the risk of MTBE contamination. In addition, since the publication of the UC report, several peer-reviewed studies were published which illustrated that MTBE will not persist in surface waters but will volatilize within a relatively short period (< 40 days). Finally, since 1998 only 5 new surface water sources have been identified as containing elevated concentrations of MTBE. In addition, since 1999, none of the monitored surface water sources had an MTBE concentration greater than 5 µg/L (CalDHS). 3

Cost Impacts. In an attempt to quantify the total costs to California's economy resulting from the continued use of MTBE in gasoline, UC researchers prepared a cost/benefit analysis of fuel alternatives. Much of the analysis performed was based on assumptions regarding the movement of MTBE in surface waters and in the subsurface, and the subsequent contamination of drinking water supplies. The key assumptions were as follows: **1)** no remediation of existing plumes, **2)** no biodegradation or adsorption of MTBE, **3)** current detection trends for public water supply systems should be extrapolated to 2010, and **4)** contamination of surface water sources would continue due boating use.

As discussed in this report, more recent data show that none of these assumptions is correct. Existing known plumes posing threats to water supplies are or will be remediated. Bioattenuation of MTBE plumes appears to be occurring at varying rates at multiple sites suggesting that many plumes are not likely to expand significantly from their current size. The frequency of detection of MTBE in public water supply wells is decreasing with time, and the frequency of detection in new wells recently sampled has decreased substantially compared to results reported prior to the UC study. Finally, the ban on 2-stroke engines has essentially eliminated the threat of MTBE to surface sources of water supply. 4

While this review did not attempt to reassess the UC cost analyses, it clearly reveals that a number of the costs reported by the UC report will be far less than predicted. For example, there will be no annual costs for loss of recreational use of surface water sources (estimated to be between $160 and $200 million). Monitoring costs should also be decreasing rapidly as the MTBE threat to surface water fades. Finally, drinking water costs will be less than predicted by the UC report because of fewer impacts to public water supply wells. No assessment of the incremental costs for remediation of underground tanks has been made in this analysis. However, new technologies, particularly in-situ biodegradation are likely to result in significant decreases in overall remediation costs for MTBE impacted sites.

Introduction

In March 1999, the University of California released a comprehensive evaluation of the health and environmental effects of the use of MTBE and other oxygenates in California entitled "Health and Environmental Assessment of MTBE: Report to the Governor and Legislature of the State of California as Sponsored by SB 521." The Report concluded that "on balance, there is significant risk to the environment from using MTBE in gasoline in California." In particular, the Report predicted that there was a significant threat to water quality in the State and that a large number of public water supply systems and private drinking water wells would be contaminated by the continued use of MTBE in gasoline. The findings of the report prompted the Governor to issue Executive Order D-5-99, which requires the complete removal of MTBE from gasoline sold in California by December 31, 2002.

Since the publication of the UC Report, several new studies and additional groundwater and surface water monitoring data in California, as well as other states in the U.S. have significantly improved the knowledge base on the behavior of MTBE in the aquatic environment. In addition, conventional and emerging soil and groundwater remediation technologies have been assessed for their effectiveness at remediating MTBE-impacted sites, and several of these technologies have been successfully applied at the field-scale level to remove MTBE from soil and groundwater.

Based on this new information obtained since the release of the UC Report, it is now possible to assess whether the assumptions made by the UC team are accurate or whether these assumptions, and subsequent conclusions regarding the future impacts of MTBE on water quality should be modified. This memorandum focuses on the following issues:

1. The implications of monitoring data since 1998 regarding MTBE in surface and groundwaters in California, and the likely overall future impacts on public water supply systems in California;
2. The implications of more recent findings regarding the fate of MTBE plumes in groundwater on the likelihood of future impacts to public water supply systems;
3. Remediation of MTBE-impacted soil and groundwater, and treatment technologies for the removal of MTBE from water.

The overall objective of this evaluation is to determine whether the assumptions made in the UC Report are still valid given the advances made in MTBE research and new monitoring data, and whether appropriate changes to those assumptions lead to different conclusions regarding the magnitude of the MTBE threat to public and private water supplies in California.

Overview of Statewide Drinking Water Detections

The UC report concluded that the contamination of public and private drinking water supplies with MTBE in California was widespread and growing. However, at the time of the UC study, the available monitoring data on public water supply systems collected from 1995 to 1998 by the California Department of Health Services (CalDHS) indicated that only about 2% of all sampled drinking water sources had detectable levels (approximately 1 to 5 ppb) of MTBE. Most importantly, more recent monitoring data clearly show that the frequency of detections for MTBE has decreased as more public water supply systems have been sampled. Thus, predictions of future impacts based on extrapolation of monitoring data taken between 1995 and 1998 overestimate the likely impacts of MTBE on California public water supply systems, as is discussed subsequently in this memorandum.

In the UC report, researchers relied on drinking water monitoring data provided by CalDHS up to August of 1998. Although the UC report recognized that the percentage of drinking water sources with detectable levels of MTBE was low (about 1.2%), UC researchers predicted that there would be a significant increase in the number of drinking water sources impacted by MTBE in future years (assuming that the percentage of detections would remain the same indefinitely).

For the purposes of the analysis performed in the UC study, California's water supply was divided into surface water and groundwater sources. The UC report indicated that both sources are highly susceptible to widespread and long-term contamination by MTBE. This was a key assumption that formed the basis for overall conclusions regarding the future threats of MTBE to water supply systems. The more recent data strongly indicate that this assumption significantly overstates the future impacts of MTBE on public drinking water systems as will be discussed in detail in the next several sections.

Surface Water Sources

UC Report Conclusions. To quantify the adverse effects related to the use of MTBE-blended fuel in surface water recreational vehicles, UC researchers defined three distinct cost impacts related to surface waters. First, UC researchers stated that every surface water source used as both a motorized recreational area and a drinking water source would require treatment for the removal of MTBE. Second, the UC report suggested that as a result of this extensive MTBE contamination, recreational boating would be banned on all drinking water reservoirs thereby incurring significant costs associated with the loss of these recreational areas. Finally UC researchers predicted that water utilities would incur large incremental monitoring costs due to the usage of MTBE in gasoline.

Current Observations. Recent events and recent monitoring data do not support the worst-case assumptions made by the UC team. First, many water utilities have either banned or severely restricted the use of two-stroke engines on many of California's drinking water reservoirs. The criticism of the use of these highly polluting engines began well before 1995. Two-stroke engines are known to emit as much as 30% of their fuel directly into the water as unburned fuel (Bluewater Network). Consequently, recreational crafts with two-stroke engines were banned in at least nine high-profile public surface waters in California since 1998. These include Anderson and Calero Reservoirs, all waterways in Marin, Coyote Lake, Donner Lake, Lake Tahoe, Modesto Reservoir, and San Pablo Reservoir. Most of the other large reservoirs in California had either previously banned two-stroke engines or never allowed it.

The UC report also expressed some uncertainty regarding the persistence of MTBE once dissolved in surface water. Since the publication of the UC report, several peer-reviewed studies have been published which demonstrate that MTBE will not persist in surface waters but will volatilize relatively quickly, depending on a number of factors related to the physical features of the reservoir and the wind conditions. Once MTBE sources are eliminated, these studies suggest that MTBE would not persist indefinitely and would likely be completely dissipated within several months following cessation of the use of two-stroke engines (Stocking et al., 2000 and references therein).

The findings on the fate of MTBE in reservoirs have been confirmed by recent data on surface water sources. The surface water monitoring data available at the time of publication of the UC report can be compared with current data made available since 1998. As Table 1 illustrates, only five new surface water sources have been identified since 1998 as containing elevated concentrations of MTBE, and no surface waters have been monitored with concentrations greater than 5 µg/L (the California SMCL) since 1999.

Table 1. Surface Water Reservoir Contamination

	1996	1997	1998	1999	2000	2001
Newly Identified SW sources with MTBE detects	9	4	7	4	1	0
Newly Identified SW sources with MTBE detects > 5 µg/L	2	3	2	3	0	0

Surface Water Cost Impacts. In an attempt to quantify the total costs to California's economy resulting from the continued use of MTBE in gasoline, UC researchers prepared a cost/benefit analysis of fuel alternatives. The analysis included direct and indirect costs including air quality benefits, health costs, fuel price increases, water monitoring costs, and other costs. Following this analysis, UC researchers suggested that the continued use of MTBE will result in increased incremental costs (aggregated annualized costs) specifically related to surface water, a recreational cost ($160 to $200 million) and a water treatment cost ($4 - $30 million). While it is beyond the scope of this memorandum to reassess the cost analysis performed by the UC researchers, a review of the predicted costs due to surface water contamination in California suggests that these costs are significantly overestimated, and are likely to be negligible over time. Without MTBE impacts (due to the ban of two-stroke engines at drinking water reservoirs in California), no treatment will be needed and monitoring requirements and costs will decrease with time.

Groundwater Sources

UC Report Conclusions. The UC report divides groundwater contamination into two categories: public and private drinking water wells. At the time of publication of the UC report, it appeared that MTBE detections in drinking water sources were increasing fairly rapidly. Both Santa Monica and South Lake Tahoe had recently been identified as highly impacted drinking water utilities in previous years. These high profile contamination scenarios set the stage for the assumption that many of the state's public drinking water resources would become contaminated by MTBE in the near future. Based on the information available at the time, UC researchers projected that between 60 and 340 public drinking water wells would become contaminated by MTBE, and that an additional 1000 to 5000 private drinking water wells would also become contaminated.

The predictions of the UC researchers were based on CalDHS public drinking water well monitoring data. At the time of publication, CalDHS had monitored approximately 2,988 public drinking water wells for MTBE contamination representing 21% of total public drinking water wells in California. Of these wells, 35 (or 1.2%) contained detectable levels of MTBE. While UC researchers noted that much of the DHS testing "has presumable targeted wells near suspected sources, hence it probably represents a biased sample," they went on to extrapolate that 1.2% of the entire community of untested wells could become contaminated in the future.

Current Observations. With several additional years of drinking water monitoring data, it is possible to review the accuracy of the UC predictions. Table 2 presents past and current public drinking water well MTBE contamination data in California. As suggested by the UC researchers, it appears that the most vulnerable or already contaminated sources were monitored first thus accounting for the initially high percentage of MTBE contaminated sources and the steady decline in this percentage as more sources are sampled. Thus, if the data were extrapolated based on current monitoring results, the UC authors would likely select a range much closer to their lower bound of contamination and likely below their lower bound.

Table 2. Declining Percent of MTBE Detections in Public Water Supply (PWS) Wells Between 1995 and the Present

Date	1995 – 9/1998	9/1998 – 3/1999	3/1999 – 6/2001
Number of new PWS wells sampled	2,988	1,567	3,426
Total number of PWS sampled to date	2,988	4,555	7,981
Number of PWS wells with MTBE detects	35	41	46
% of total wells with MTBE detects	1.2 %	0.9 %	0.6 %
Number of new wells with MTBE detects	-	6	5
% of new wells with MTBE detects	-	0.4 %	0.15 %

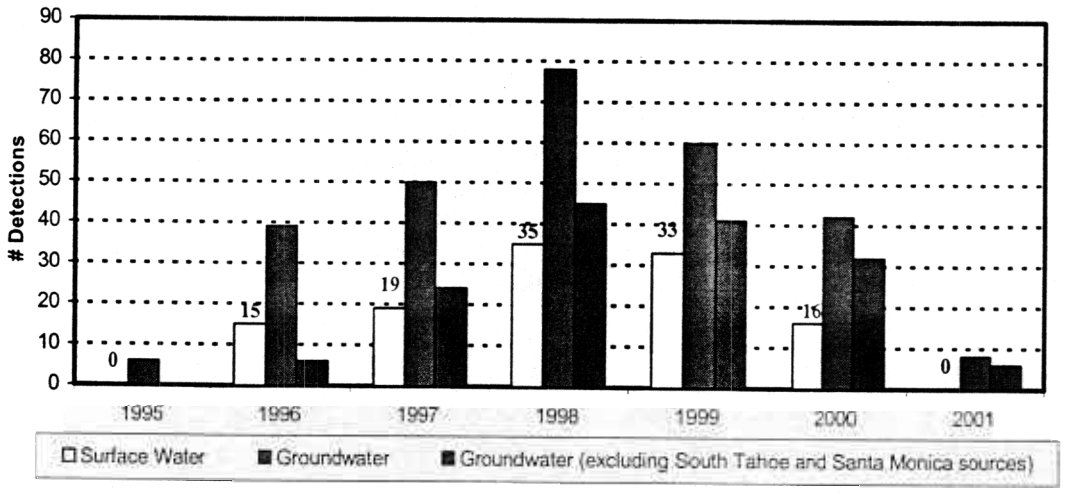
As shown in Table 2, the incremental increase in the number of new wells contaminated with MTBE between March 2000 and the present (June 2001) is 0.15%. This number is one order of

magnitude lower than that used by UC researchers (1.2%). It is very probable that the percentage of new wells with MTBE detections will continue to decrease over time. Using the current incremental increase in new wells with MTBE detections (0.15 % between March 1999 and June 2001, and assuming a total of 10,931 unsampled active public water supply wells in California, the estimated number of new wells projected to be impacted by MTBE should be 16 compared to the UC estimate of 60 to 340 wells.

Gaining an accurate picture of private well contamination is much more complicated. Due to the large number of private wells in California and the lack of monitoring and regulatory oversight, no data are readily available on private well contamination except on a hearsay basis or if reported to the state or county in an effort to recover treatment costs. In preparation for this memorandum, a review of five counties in the Bay Area– a region noted for its use of MTBE-blended fuel – was completed. Three counties reported no known private well contaminated by MTBE. The other two counties reported that a few private wells were contaminated with MTBE. However, due to the lack of any compiled information or formal database, the total number of private wells contaminated by MTBE remains unknown in California.

Combining all of the data currently available from CalDHS, one can clearly see a trend in MTBE detections across the state since 1998. As Figure 1 illustrates, 1998 represented the apex in MTBE detections statewide. Since then, both surface water and groundwater detections have decreased steadily. This most likely resulted from testing the most vulnerable or already contaminated sources first, and using those sources as an indication of future contamination.

Figure 1. MTBE Detections at Public Water Supply Sources of Drinking Water



Notes. Maximum of 1 Detection per month
Detection requires at least two positive findings at a source

Groundwater Cost Impacts. In the UC report, a cost/benefit analysis of fuel alternatives revealed that utilities in California will incur substantial costs due to potential water treatment for the removal of MTBE. A considerable portion of this cost is associated with the treatment of groundwater relative to surface water. Cost assumptions were based on a predicted number of sites requiring treatment, in addition to a large volume of groundwater requiring treatment at each site due to the continued expansion of MTBE plumes. As shown in this memorandum, the number of impacted sites is not as large as predicted by the UC report. In addition, MTBE plumes (as will be discussed below) are not expected to expand as predicted by the UC report. Finally, advances in technologies for the removal of MTBE from water suggest that treatment costs are not as prohibitive at MTBE-impacted sites relative to BTEX-only sites when the rapid detection of MTBE takes place.

Growth of MTBE Plumes

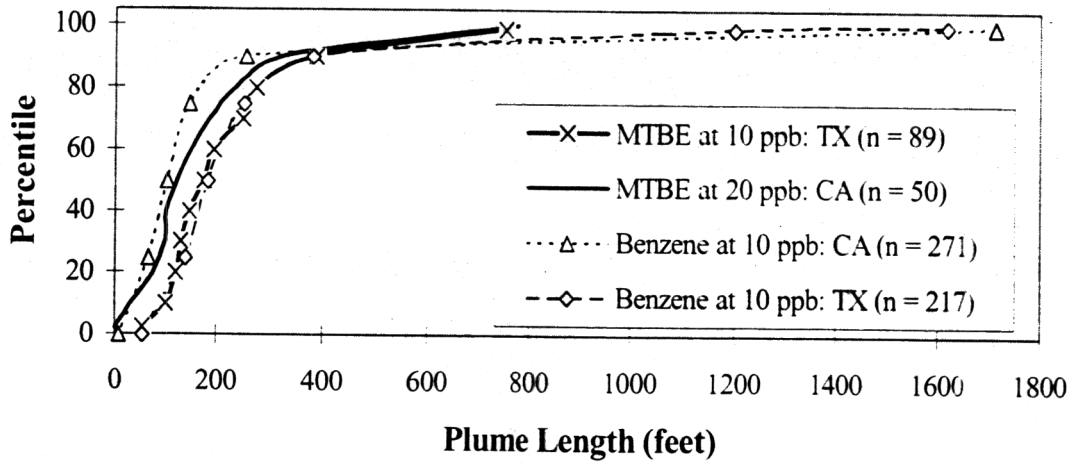
UC Report Conclusions. One of the foundations for concluding that MTBE poses a significant risk to California's environment comes from assumptions made by UC researchers regarding the movement of MTBE through the subsurface following the release of MTBE-blended gasoline from leaking underground fuel tanks (LUFTs). By assuming no biodegradation and no adsorption, UC researchers concluded that MTBE plumes will grow three to four-fold and could extend up to 7000 feet from a release site to impact a volume of groundwater of over 100,000 acre-ft by 2010.

Current Observations. Three years after publication of the UC report, the current picture of MTBE plume behavior in the field has not changed significantly. Several MTBE plumes remain long (Port Hueneme, Vandenberg Air Force Base). However, most MTBE plumes do not appear to elongate at the rate predicted by the UC report. Recently, plume studies were conducted in three states (California, Florida, and Texas) to determine the apparent distribution of BTEX and MTBE in groundwater. Figure 2 represents a compilation of data from several hundred benzene plumes and approximately 130 MTBE plumes. The results of these studies contrast directly with predictions made by UC researchers based solely on MTBE's physical and chemical properties. Based on its properties, MTBE was predicted to move at the speed of groundwater with little or no retardation. However, most of the studies reviewed to date suggest that MTBE plumes neither elongate indefinitely as predicted, nor do they span substantially longer distances than BTEX plumes (Figure 2). These studies suggest that, depending on gasoline spill history and on site geology and hydrogeology, MTBE plumes may often stabilize at a fixed distance from a point of release.

That being said, the data presented in Figure 2 are still mostly from sites with relatively recent spills. It is therefore possible that MTBE plumes at these sites did not have sufficient time to elongate significantly beyond the BTEX constituents. Figure 2 indicates that the relative volume of groundwater requiring remediation at LUST sites following the addition of MTBE to gasoline does not dramatically change immediately after a spill. Therefore, if active remediation is rapidly implemented following an accidental release of MTBE-blended gasoline, the incremental groundwater impacts associated with the presence of MTBE can be minimized.

Finally, a heightened awareness of the importance of identifying and curtailing any releases of MTBE into surface water and groundwater would suggest that accidental gasoline releases impacting drinking water resources in California will be detected earlier and stopped sooner. This more rapid control of MTBE plumes will reduce the overall impact of MTBE releases to groundwater.

Figure 2. MTBE and benzene plume studies (Texas and California)



Sources. Buscheck et al., 1998; Deeb et al., 2001; Happel et al., 1998; Mace and Choi, 1998

Bioattenuation Potential of MTBE in Subsurface Environments

UC Report Conclusions. One of the major conclusions of the UC report was based on the assumption that MTBE does not biodegrade naturally. Prior to 1998, only a few cultures were reported to biodegrade MTBE (Hardison et al., 1997; Mo et al., 1997; Salanitro et al., 1994; Steffan et al., 1997). Moreover, MTBE biodegradation in the field had not been observed at more than a handful of sites. As a result, several studies during that timeframe suggested that the bioattenuation of MTBE did not occur at significant enough rates to prevent MTBE plume elongation.

Current Observations. In contrast to the scientific understanding in 1998, several studies have recently shown that MTBE can biodegrade under a range of environmental conditions, both in laboratory samples and in the field. In addition to a significant increase in publications reporting the biodegradation of MTBE and its byproducts under anaerobic conditions (Deeb et al., 2001 and references therein), MTBE has been recently shown to biodegrade under methanogenic (Hurt et al., 1999; Wilson et al., 1999), nitrate-reducing (Landmeyer et al., 2001) and iron-reducing conditions (Finneran et al., 2001). In addition, the biodegradation of MTBE has been demonstrated in sediment samples under denitrifying conditions (Bradley et al., 2001).

These recent results suggest that MTBE has the potential to naturally biodegrade under a range of environmental conditions. Thus, the assumption made in the UC report regarding the lack of biodegradation of MTBE in groundwater is no longer valid. While the exact consequences of these findings have not yet been quantified, the assumption that all MTBE plumes will grow indefinitely is clearly incorrect. Ongoing research efforts in the near future are likely to provide a quantitative basis for analyzing the future fate of existing MTBE plumes.

Remediation of MTBE-Impacted Soil and Groundwater, and Treatment Technologies for the Removal of MTBE from Water

UC Report Conclusions. In the "Summary" section of the UC Report, it was stated that the properties of MTBE present challenges for conventional water treatment processes while emerging technologies such as bioremediation have not yet been proven effective. The Report concluded that incremental costs for soil, groundwater and drinking water treatment would be very high due in part to the technical challenges of remediating MTBE impacted sites.

Current Observations. The UC review of the effectiveness of a range of MTBE remediation and treatment technologies was very thorough, but actual field experience with MTBE remediation was discussed only briefly since such information was not readily available at that time. Since the publication of the Report, many of these technologies have been tested at the field-scale for MTBE removal. The knowledge gained from these case studies demonstrates that many MTBE sites can be effectively remediated at a cost less than projected using conventional technologies.

A current evaluation of MTBE remediation technologies reveals that conventional technologies are effective at MTBE-impacted sites and that they are being widely applied on a national basis. Demonstrated remediation technologies include air sparging, pump-and-treat, multi-phase extraction and soil vapor extraction, all of which have been widely applied at gasoline-contaminated sites prior to the widespread use of MTBE in gasoline. Case studies demonstrate that conventional technologies can be very effective at removing MTBE from soil and groundwater relative to BTEX removal from environmental media (CA MTBE Research Partnership, 2001). The successful removal of NAPL sources is not impacted by the presence of MTBE.

In addition to conventional technologies used at gasoline-contaminated sites, emerging technologies or modifications to existing technologies can greatly reduce the life cycle remediation costs at MTBE-impacted sites. For example, while the use of in-situ technologies such as bioremediation was emerging in 1998, recent successful field applications (Salanitro et al., 2000; Mackay et al., 2000) suggest that bioremediation and other emerging technologies have great potential for success at MTBE-impacted sites. Such a technology is now commercially available, and on-going research studies are promising with respect to the efficiency and relative cost effectiveness of bioremediation.

In summary, unit costs for remediation of MTBE impacted sites, and unit costs for MTBE removal from groundwater are likely to decrease in the future as a consequence of research efforts since the UC Report, and research studies now under way funded by federal, state and private entities are likely to reduce unit costs.

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Pat Perez - COMMENTS ON POSSIBLE IMPACTS OF MTBE PHASE OUT ON GASOLINE SUPPLIES

From: <Bridgette.Trichter@Fortum.com>
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Subject: COMMENTS ON POSSIBLE IMPACTS OF MTBE PHASE OUT ON GASOLINE SUPPLIES

> <<CEC,Certainty.doc>> <<CEC,Cover.doc>> <<CEC,De Minimis.doc
> <<CEC,T50 Needs.doc>>
>
Dear Pat,

In order to meet the March 1, 2002 comment deadline, I have attached a cover letter and 3 comment documents on the above subject. I will send confirming documents via US mail.

Best regards,

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NESTE

NESTE OIL HOLDING (U.S.A.), INC.
Comments on the Report:
"Impact of MTBE Phase Out"
By Stillwater Associates
Presented at the February 19, 2002
CEC Fuels and Transportation Commission Workshop

Certainty Enhances Supply

First we would like to compliment the Commission and their consultant Stillwater Associates. The conclusion that California may be facing a significant supply shortage is consistent with our market analysis. The assumption that the only merchant MTBE plant that can be ready to supply California with Isooctane is the Canadian MTBE plant (Neste Canada as a joint venture partner) is consistent with our plans and market intelligence. 1

This Canadian MTBE plant was built to supply the MTBE California needs to improve and maintain its air quality. After Governor Davis banned MTBE effective December 31, 2002, we began designing, engineering, permitting and fabrication of the modifications necessary to convert the MTBE plant to produce isooctane. The possibility that California might delay the ban creates a dilemma for us. Do we complete the conversion or do we put the project on hold?

If Governor Davis promptly announces that the MTBE ban will not be delayed, we will, just like we were in the past with MTBE, be there for California with isooctane to help minimize the potential supply shortfall.

If Governor Davis promptly a delays the MTBE ban, we might be able to delay construction and continue to produce the MTBE California needs to avert the supply shortfall described in the Stillwater Associates report. If California eventually decides to ban MTBE, we can because of the work we have done, be ready to produce isooctane after the next summer construction season 2

If Governor Davis does not promptly announce that the MTBE ban is delayed, we will comply with current law and complete the conversion. If California then delays the MTBE ban we will not be able to supply the MTBE California needs and will have a product for which the market is not ready. If MTBE is allowed in California gasoline, both the dilution and octane value of isooctane as a gasoline blendstock decreases. This could create a negative manufacturing margin which could cause California to lose both the MTBE product because the plant was converted and the isooctane product because the plant was shut down due to negative margin.

Indecision has the greatest potential to damage California's gasoline supply. 3

NESTE

California Energy Commission
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Sacramento, Ca 95814

Re: Possible Impacts of MTBE Phase Out on Gasoline Supplies

NESTE Oil Holding (U.S.A.), Inc. appreciates the opportunity to comment on the above issue. We are commenting because NESTE Canada is a joint venture partner in the Canadian MTBE plant that Stillwater Associates assumed would convert to make isooctane. In general we agree with the conclusions reached by Stillwater Associates. We are however submitting three comments that we believe will enhance the supply situation for California. We have provided three standalone attachments containing more detailed comments so that it will be easier for you to sort and incorporate them in CEC's report. Here are synopses of our comments:

1 Certainty is the key to long term supply security. Uncertainty could result in California being deprived of both the current MTBE production from the Canadian plant and the potential isooctane production. We need a decision now so that we can either proceed with converting the plant to make isooctane or delay the construction so we can continue to supply MTBE to California.
2 The isooctane product contains some C8 ethers that need to be accommodated in CARB's de minimis oxygenate definition. 4
3 Increasing the T50 cap in CaRFG3 will make it easier to use the isooctane and C8 Alkylate products and enhance California's gasoline supply. 5

NESTE trusts you will find these comments helpful as you improve California's access to gasoline and gasoline components from outside of the state.

NESTE OIL HOLDING (U.S.A.), INC.

Jouko Helin
Jouko Helin
Vice President

NESTE

NESTE OIL HOLDING (U.S.A.), INC.
Comments on the Report:
"Impact of MTBE Phase Out"
By Stillwater Associates
Presented at the February 19, 2002
CEC Fuels and Transportation Commission Workshop

De Minimis Oxygenate Definition Could Increase Supply Shortfall

First we would like to compliment the Commission and their consultant Stillwater Associates. The conclusion that California may be facing a significant supply shortage is consistent with our market analysis. The assumption that the only merchant MTBE plant that can be ready to supply California with Isooctane is the Canadian MTBE plant (Neste Canada as a joint venture partner) is consistent with our plans and market intelligence.

This Canadian MTBE plant was built to supply the MTBE California needs to improve and maintain its air quality. After Governor Davis banned MTBE effective December 31, 2002, we began designing, engineering, permitting and fabrication of the modifications necessary to convert the MTBE plant to produce isooctane. Assuming the ban stays in place, the de minimis oxygenate definition that the California Air Resources Board (CARB) staff is working on may be a barrier to supply. If that definition is not done correctly, increase your projected supply shortage by the volume of isooctane Stillwater Associates assumed they would get from Canada.

CARB has a mandate to develop a workable MTBE de minimis definition in order to satisfy water interests in California. The MTBE to isooctane plant conversion is designed so that MTBE content will not be a problem. However, the process does produce isooctene that contains some ethers containing 8 carbon atoms (C_8 ethers). The hydrogenation of the isooctene to isooctane reduces but does not eliminate these C_8 ethers because hydrogenation conditions severe enough to eliminate the C_8 ethers would destroy the isooctane. The very low solubility of these C_8 ethers in water both prevents the use of a water wash to remove them from the product and mitigates any water contamination risk. We have provided additional technical information to CARB on this subject. However, we encourage CEC and/or the governor to encourage CARB to develop a definition that does not exclude Canadian isooctane from California's gasoline supply.

NESTE

NESTE OIL HOLDING (U.S.A.), INC.
Comments on the Report:
"Impact of MTBE Phase Out"
By Stillwater Associates
Presented at the February 19, 2002
CEC Fuels and Transportation Commission Workshop

Raising T50 Cap Could Enhance Supply

First we would like to compliment the Commission and their consultant Stillwater Associates. The conclusion that California may be facing a significant supply shortage is consistent with our market analysis. The assumption that the only merchant MTBE plant that can be ready to supply California with Isooctane is the Canadian MTBE plant (Neste Canada as a joint venture partner) is consistent with our plans and market intelligence. We agree with the conclusion that alkylate made from propylene and isobutane (C_7 Alkylate) will be in short supply and not available as a segregated gasoline blending component.

This Canadian MTBE plant was built to supply the MTBE California needs to improve and maintain its air quality. After Governor Davis banned MTBE effective December 31, 2002, we began designing, engineering, permitting and fabrication of the modifications necessary to convert the MTBE plant to produce isooctane.

When California begins to rely upon imports of cleaner burning gasoline components like isooctane and alkylate made from butylene and isobutane (C_8 Alkylate) the current cap on midpoint distillation temperature (T50) may be a barrier to supply. Unlike the T50 of C7 Alkylate the T50's of these components are above the California specification. Increasing the T50 cap could make it easier for refiners to use these components and thereby increase California gasoline supply.

The process for making isooctane in a converted MTBE plant produces a product containing a little over 90 percent by volume of isooctane that boils at 211 degrees Fahrenheit. The majority of the remaining product is isoparaffins containing 12 carbon atoms (C_{12} Isoparaffins). A typical isooctane T50 would be about 220 degrees Fahrenheit. C_8 Alkylate contains a wider mix of isoparaffins and has a typical T50 of about 225 degrees Fahrenheit. Adding either of these components to California Phase 3 reformulated gasoline (CaRFG3) results in gasoline blends that are cleaner than they have to be. Therefore, increasing the T50 cap to accommodate their use has the potential to increase supply while helping California air quality.

Because T50 has significant influence on the emissions calculated by the CARB Phase 3 Predictive Model (PM3); the actual increase in T50 will be limited. However, the additional degree of freedom has the potential to increase supply. When CEC modeled the impact of the CaRFG3 specifications, their simulation found that gasoline cost less when the T50 increased. Lower costs in such simulations imply increased supply. Therefore, because PM3 will limit the actual T50 increase while protecting air quality and the additional degree of freedom will enhance supply, we encourage CEC and/or the governor to encourage CARB to increase the T50 cap. This will make it is easier for refiners to use more cleanly burning components like isooctane and C8 Alkylate.

Pat Perez - Comment Submission: Possible Impacts of MTBE Phase Out on Gasoline Supplies

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From: "Tammy Klein" <tklein@chemweek.com>
To: <pperez@energy.state.ca.us>
Date: 3/1/02 10:24 AM
Subject: Comment Submission: Possible Impacts of MTBE Phase Out on Gasoline Supplies
CC: "'Nick Economides'" <neconomides@chemweek.com>

Dear Pat,

Attached are comments submitted on behalf of Nick Economides, Managing Director, Technical Services of Hart Downstream Energy Services in response to the "Possible Impacts of MTBE Phase Out on Gasoline Supplies." I will be following up this transmission with a hardcopy for your records as well.

If you have any questions, please contact me. Best regards,

Tammy W. Klein
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Government Relations Group
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USA
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<<...>>

Possible Impacts of MTBE Phase Out on Gasoline Supplies

Comments Presented to

California Energy Commission
Attention: Pat Perez
1516 Ninth Street, MS 23
Sacramento, CA 95814
pperez@energy.state.ca.us

Nick Economides
Managing Director, Technical Services
Hart/IRI Fuels Information Services
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Hart's Downstream Energy Group appreciates the opportunity to submit comments to the California Energy Commission on the recently completed study by Stillwater Associates entitled, "Impact of MTBE Phaseout," and to some of the comments made regarding this study at the workshop held by the Commission on February 19, 2002. Our organization serves the refining industry through standard-setting publications such as Octane Week, Diesel Fuel News and World Refining Magazine and conferences held annually around the globe. We also offer consulting services to the industry through our International Fuel Quality Center, which currently comprises more than 60 member organizations, including many of the leading refiners, automakers and technology suppliers around the world. We have been closely monitoring California developments on this issue and feel uniquely qualified to offer our perspective on two key issues in this debate:

- The availability of clean burning blendstocks to replace MTBE in California's gasoline supply.

- The potential for maximizing ethanol blending in California gasoline to fill the projected shortfall.

We note that the bulk of the economic analyses performed in 1998-99 (leading up to the California MTBE ban decision) were performed under the following assumptions:

- California would be the only state to ban MTBE.
- Clean stocks available for import would be plentiful and reasonably priced.
- Ethanol production would be expanded and infrastructure upgrades would be in place to guarantee California's supply.
  Refiners would have sufficient lead time to make necessary modifications to replace a portion of in-state gasoline production capacity.

We agree with CEC's assessment that several of these conditions do not appear to be "holding up:"

- California is clearly not the only state moving forward with action to reduce and/or eliminate the use of MTBE. Similar action is well underway in the Northeast.

  We support the finding of Stillwater Associates that there are no significant volumes of clean blendstocks that can be made available to California from the rest of the U.S. or from abroad in the short term. Segregation of propylene alkylate is not expected to be practiced in the U.S. Gulf refining sector, and the volume of propylene directed to alkylation will never be large, as the economics clearly favor the diversion of this material to the chemical feedstock sector rather than fuels blending.

- The lead time California provided the refining industry has not been utilized as envisioned. Refiners have generally been inclined not to make major investments to replace in-state gasoline production volume. "Lead time" should not be interpreted to mean time to install ethanol blending facilities at terminals and implement small

fractionation changes at the refinery to produce on-spec CARBOB. It is meaningless to present long lead time as the means to reduce the price impact if the industry is not going to use the extra time to at least ensure that in-state gasoline production capacity is protected.

- An evaluation of the ethanol supply outlook is largely outside the scope of the Stillwater study that simply indicates that, even if ethanol issues are satisfactorily resolved, California will be facing a 5 to 10 volume percent gasoline supply shortfall.

AVAILABILITY OF CLEAN BURNING BLENDSTOCKS FOR IMPORT INTO CALIFORNIA

The largest potential source of clean blendstocks into California would be the conversion of current MTBE producers into some combination of alkylate and/or isooctane production. There are no market indications that MTBE producers (domestic or international) are undertaking conversion of their world-scale MTBE plant to alkylate and/or isooctane (except Fortum/Chevron joint venture in British Columbia).

- The timing of any such conversion would be governed by commercial, i.e., financial conditions for these producers. It will require market demand for the product (alkylate or isooctane) adequate to provide contractual commitments at a price and volume at ratable flows to justify the ventures. The current economics do not provide income adequate to provide the cash costs to produce isooctane EVEN IF the processing facilities were in place and operable.

- The time required to evaluate, engineer, approve, permit, detail engineer, purchase materials and construct facilities to produce alternative blendstock components. The combined time required for this "cycle" could easily exceed 36 months.

  The alternative product market will have to justify the construction or conversion of facilities to produce it before the resources are committed. The current market does not justify the conversion of operating facilities to produce blending components to replace MTBE.

The notion of a government edict affecting a company's opportunity to produce a viable, valuable product arguably without proper cost/benefit analysis is inherently troubling as it is. Irrespective of that, it is entirely unreasonable to expect the same company to expend large sums of money and human resources to produce a product that has no defined market and shows costs greater than income. We believe that:

It is likely that conversion of merchant MTBE units will not take place before the issue is settled at the national level, IF it takes place at all. Certainly redirection of current MTBE production to international markets is a significant possibility.

By extension, If California can not expect incremental clean blendstock production supplies from current domestic MTBE merchant producers, our attention should turn to the current level of clean blendstock supplies and the extent to which they could be made available to

California. Generally, the existing supply of desirable clean blending components has been committed to the markets in which they currently serve. Thus, any new components to be made available for California must be produced in existing spare capacity and from existing surplus feedstock. These are serious obstacles to overcome to assure adequate, timely supply for California.

Furthermore, the availability of such existing "clean blendstocks" for import into California is greatly complicated by the stricter environmental requirements for cleaner Federal Phase II RFG, anticipated impact of the recently promulgated EPA Mobile Source Air Toxics (MSAT) rule, and other state MTBE phaseout action (New York, Connecticut, etc.). Gasoline specifications in the rest of the country like MSAT should not be discounted – it is simply not as easy to make clean burning gasoline for those markets without MTBE and the same components that California needs will be highly coveted. The assumption that California can simply "bid away" barrels from those markets should be carefully reexamined.

As far as the national legislation is concerned, we should note that there is considerable activity in the Senate that is introducing additional uncertainty and could lead to major realignments in the national fuel supply and distribution outlook. From our perspective, it certainly remains to be seen how alternative clean blendstock components can compete against ethanol (a mandated, heavily subsidized component) in a world of ever-tighter gasoline product specifications. One thing is clear: there appears to exist no federal legislative scenario that would carve out California-only action. Similarly, no regulatory relief on the MTBE issue is forthcoming and, in our opinion, none should be expected. In our view, this has always been an issue that Congress needs to settle and that has not changed. We believe that it would be very advantageous for California to see what national picture will emerge and determine California's best interests in that scenario of supply and demand.

MAXIMIZING ETHANOL BLENDING IN CALIFORNIA PHASE II RFG

In addition to the comments above on the availability of clean blendstocks for import into California, we would like to briefly touch upon the issue of potentially blending additional volumes of ethanol in CARB Phase 3 gasoline in order to help alleviate the overall gasoline volume shortage outlined in the Stillwater Study. This was advocated as a possible solution by some commenters during the February 19 workshop. It was suggested that such a course of action may have some merit and that the Energy Commission should work with the Air Resources Board to examine ways to make it more attractive for refiners to blend additional volumes of ethanol in California gasoline. The Stillwater report assumed 5.7 volume percent would be blended in all California gasoline arriving at a total ethanol import volume of 55 thousand barrels per day (MBBL) for the state. Furthermore, Stillwater did not delve into the uncertainty of ethanol supply or the status of California's ethanol infrastructure improvements. Instead, Stillwater simply assumed that ethanol would be made available to California refiners in the above volume, as needed and on a timely basis.

The idea that an additional 4 volume percent of ethanol (up to 10 volume percent) could be blended in CaRFG3 to "close" the projected 5-10 volume percent gasoline supply shortfall projected by Stillwater, might appear to have some merit upon first examination. We note. for

example, that the adverse vapor pressure effect of adding ethanol to gasoline occurs with the initial increment of ethanol added and there would be no further volatile organic compound emission (VOC) increases associated with the incremental ethanol volume. Refiners would not have to reduce the vapor pressure of their base gasoline blendstock (CARBOB) further in order to accommodate the incremental ethanol volume. Furthermore, the additional volume of ethanol might provide some additional diluent for other, less desirable, blendstock components that could not otherwise be incorporated in California's gasoline pool. Lastly, the incremental ethanol volume would help relieve the significant octane shortage that refiners are expected to experience following the removal of MTBE from the pool.

While these reasons would seem to argue for CEC and CARB to pursue increasing the amount of ethanol blended in CaRFG3, we believe that relying on maximizing ethanol blending as the means to fill California's gasoline supply shortfall is both impractical and ill advised for the following reasons:

- According to the Stillwater report, 55 MBBL of ethanol per day would be needed to supply California. This is a daunting volume when we consider that the entire nation currently utilizes slightly over 100 MBBL/day, with very little demand in California. Increasing the volume percent ethanol in California's pool from 5.7 volume percent to 10 volume percent would raise California's daily requirement from 55MBBL to 96.5 MBBL, an amount nearly equivalent to the volume currently consumed by the remaining 49 states combined. If we factor in the projected increase in ethanol demand from other regions of the country considering phasing out MTBE (i.e., the Northeast), even the aggressive ethanol supply growth figures showing 150 MBBL/day of total supply by year-end 2002 do not seem adequate. Regardless of one's assessment of the progress made by the ethanol industry to gear up for such an increase in demand, it is simply unreasonable to expect that California ethanol supply can be increased sufficiently short-term to materially impact the state's projected gasoline shortage.

  The assumption that actual wet-barrels of ethanol will flow to California in the volumes needed to close the gasoline supply shortfall is even more suspect given the recent federal legislative proposals that would permit credit averaging, banking and trading to fill any national Renewable Fuel Standard (RFS) requirement. Such provisions are intentionally designed to keep ethanol blending to those regions (primarily PADDs II and IV) where expanded use makes the most economic sense. If anything, CEC should be concerned with whether the base volume assumed by Stillwater will be made available to the state should a national RFS be implemented.

  Following the blueprint of the Stillwater report, we would suggest that, even if the requisite volumes of ethanol were available for import into California, the state's infrastructure does not appear to be capable of handling the volume without additional upgrades. Centralized rail car unloading facilities to permit receipts of "unit-trains" into the state have not been constructed, nor is there a network in place to distribute ethanol from such facilities to the terminals where ethanol blending will take place. We would also expect that the same marine terminal shortcomings (unloading and storage facilities)

that Stillwater Associates discusses relative to clean blendstock imports also apply to ethanol marine receipts into the state.

Lastly, encouraging the blending additional volumes of ethanol into CaRFG3 makes little sense from an environmental standpoint. While it is true that there will not be any adverse VOC impact, nitrogen oxide (NOx) emissions are expected to increase exponentially as the amount of ethanol is increased from 5.7 volume percent to 10 volume percent. The Air Resource Board's predictive model accurately depicts the sum total of our current knowledge from various studies on this subject matter. Based on CARB's own 1998 study of ethanol fuels, we would expect roughly a 14% increase in NOx emissions as the level of ethanol blending is increased. We would encourage both CEC and CARB to carefully evaluate the NOx environmental impact before further adjustments to the predictive model are considered. Similarly, we believe that the increase in acetaldehyde emissions that would be expected with maximum ethanol blending should be reviewed in responding to calls for increased ethanol blending in CaRFG3.

In conclusion, we would urge both CARB and CEC to avoid further compromising the state's air quality program in the face of marketplace "pressure." In our view, even the last round of changes (which relaxed T50 and T90 and raised the aromatics cap) represent a relaxation of the environmental performance of CaRFG3 in the name of refining operating or gasoline supply "flexibility." Some commenters insinuated at the February 19th workshop that California should continue along this path, to alter the NOx penalty assigned for higher ethanol blends in the predictive model. We believe that such action would not only be technically unjustifiable, but would also seriously jeopardize achieving the state's ambient air quality goals. It should be recalled that the Governor's direction to facilitate the removal of MTBE from the state's gasoline pool should be accomplished with minimal supply/price impact and without adversely affecting air quality. We believe that these objectives can be best accomplished by providing the additional lead-time suggested by Stillwater Associates and would strongly urge that California align its action on MTBE with whatever direction and timetable is settled upon by the U.S. Congress.

We appreciate the opportunity to comment on this important matter.

COMMENTS
OF
PHILLIPS PETROLEUM COMPANY
ON

STILLWATER ASSOCIATES
DRAFT REPORT
FOR THE
CALIFORNIA ENERGY COMMISSION

"MTBE PHASEOUT IN CALIFORNIA"
February 18, 2002

March 1, 2002

Phillips Petroleum Company ("Phillips") is pleased to submit the following comments on Stillwater Associates' Draft Report for the California Energy Commission, "MTBE Phaseout in California". Phillips and its subsidiaries manufacture, transport, exchange, and sell gasoline and diesel fuel in California through some 1600 Union 76 and Circle K retail sites. Phillips purchased Tosco Corporation in September 2001 including its California assets.

Phillips is prepared to produce California gasoline without MTBE by the December 31, 2002 regulatory deadline. As background, Tosco expressed initial support for eliminating MTBE from California gasoline as early as 1997. Tosco strongly supported Governor Gray Davis' March 1999 Executive Order that called for the elimination of MTBE "at the earliest possible date, but not later than December 31, 2002." Governor Davis said at the time that he would work with oil companies to expedite the elimination of MTBE by voluntary agreement. Tosco, which had already eliminated MTBE from gasoline in three Bay Area Counties in 1998 immediately responded and was the first company to eliminate MTBE in Lake Tahoe gasoline. Tosco then joined Governor Davis in a December 1999 joint press conference to announce Tosco's plan to remove MTBE from gasoline by the end of 2000 contingent on EPA's issuance of an oxygenate waiver for California. Although EPA did not waive the oxygen mandate, Tosco still responded and reduced its MTBE use in California by 80-90% by late 2000 and started purchasing and blending over 6000 barrels per day of ethanol in California gasoline. Tosco took this major voluntary action two years before the regulatory deadline. Phillips has continued this program since its purchase of Tosco last year.

Phillips continues to support the elimination of MTBE from California

the December 31, 2002 regulatory deadline. Phillips has completed all necessary improvements to our refineries and terminals and those facilities are in operation today. Phillips has been successful to date in producing non-MTBE gasoline with ethanol but was and is fully anticipating that other California refiners would join us in making this gasoline no later than fall 2002. However, operating as the sole major producer/marketer of California gasoline with ethanol can be difficult. A California MTBE phaseout delay, particularly one linking the use of ethanol with a gasoline supply crisis, creates a dilemma for Phillips. At a minimum, such a delay would therefore cause Phillips to re-evaluate our ability to continue producing non-MTBE gasoline in California.

Stillwater is suggesting that maintaining the December 31, 2002 MTBE phase out deadline will contribute to an unacceptable gasoline supply situation for California, and that a three-year delay will give industry and government more time to resolve these supply concerns. Phillips does not see this as an acceptable public policy recommendation, delaying one major public policy goal (protection of water resources) to address another goal (gasoline supply). We are prepared to work with California officials and other stakeholders to seek out and evaluate constructive solutions so that Californians can have both gasoline and water free from MTBE and adequate gasoline supply.

REAP

Renewable Energy Action Project

March 1, 2002

The Honorable Gray Davis
State Capitol Building
Sacramento, CA 95814

RE: MTBE Phase Out in California/ Stillwater Associates Study

Dear Governor Davis,

The Renewable Energy Action Project (REAP) urges you to hold firm on the MTBE deadline.

Almost three years have passed since your Executive Order, and all sectors of the transportation fuels industry have invested heavily to comply with your vision. Nearly twelve months before the deadline, most refiners are committed to the phase-out schedule, the ethanol industry has more than doubled output to meet projected California demand, and the transportation and logistics industry has confirmed its ability to ship and distribute ethanol by 2003.

In regard to the Stillwater report, in-depth studies by the California Energy Commission (CEC) do not corroborate Stillwater's concerns about pump price increases as a result of the MTBE deadline. Furthermore, the Stillwater report fails to consider the costs of ongoing MTBE use, which range from cleanup to stranded investments. It does not consider high-risk scenarios inherent with increased dependence on imported oil. In addition, it is difficult to quantify the public health costs of extending the deadline. However, Californians have made themselves clear: they are not willing to bear the burden of ongoing MTBE use.

In addition, we offer the following comments:

1.) Price Spike Concerns Overblown: As the Stillwater report data suggests, immediate price spikes are unlikely to occur because the MTBE phase-out will occur during the winter months. During this period, the true value of ethanol as a strategy to extend gasoline supplies is realized due to greater regulatory flexibility. There is no blending reason for gas prices to increase during this period, and we encourage you to put the oil companies on notice that they will be held accountable. If supply shortages are anticipated as the summer season approaches, existing fuels regulations already allow refiners to apply for variances, as demonstrated in 1999 by the Chevron Corporation. Complementary legislative protections could be enacted to clarify the fuel variance process to apply directly to the MTBE phase-out, or

provide additional consumer protections. In addition, the CaRFG 3 Predictive Model should be corrected to reduce the risk of summertime shortages (see below).

2.) Oxygen Waiver Counter-Productive: Ongoing efforts to exempt California from the oxygen waiver (or RFS) are counter-productive and contribute to the uncertain regulatory environment that is crippling the transition away from MTBE. Though contrary to the rhetoric coming from the oil companies, actual data from the CEC reports by Math Pro and Stillwater demonstrate that non-oxygenated gasoline is more difficult and expensive to produce, and requires more imports of foreign blend stocks. In seeking a waiver, California is endorsing the use of alkylates as a complete replacement for MTBE. According to the CEC, alkylates are in short supply and have reached " extraordinary" price levels during the last twelve months. Although you may believe that both alkylates and ethanol will be used to fill the MTBE void, an oxygen waiver would cripple efforts to ship and supply ethanol to California, even if the oil industry reversed their well-documented tendencies and started blending ethanol voluntarily to keep gasoline prices stable. In essence, an oxygen waiver increases the chances of alkylate-induced supply shortages and decreases the chances that ethanol will be available to bail California out.

3.) Benefits of Increased Ethanol Use: Currently, 10 percent of California's electricity comes from renewable resources. Your administration set a goal to increase California's use of renewable electricity to 17 percent by 2010. With a few quick policy changes you can set the transportation sector on a similar course, while simultaneously catalyzing rural economic development, reducing global warming emissions and decreasing petroleum use. You could very quickly rally California's agricultural, environmental and political communities around this effort. This is an appropriate and feasible goal that would ultimately result in greater liquid fuel supply and lower gasoline prices. We would enjoy an opportunity to assist this effort.

4.) ARB Regulations: On February 29, 2002, the California Energy Commission stated that the CaRFG 3 Predictive Model should be reconsidered as a strategy to increase refiner flexibility. Currently, it is virtually impossible for refiners to blend 10 percent ethanol (E10) because of erroneous assumptions about oxygenated fuels increasing NOx emissions. The model should be updated to reflect recent Automobile Alliance tests, which show reduced NOx emissions in new vehicles using oxygenates. Although refiners will still need to eliminate some " light ends" in order to meet air quality regulations when adding higher quantities of ethanol, a ten percent ethanol blend will result in much greater net fuel volume

gains than 5.7 percent ethanol blends. It is possible that this one regulatory adjustment could make up the 5 percent supply shortage predicted by Stillwater Associates (as opposed to using MTBE for that purpose). Supply could be extended by more than five percent if some refiners use the pentane light ends to make other products such as iso-octane. Correcting the CaRFG3 model would certainly reduce the chances of summertime supply shortages. It would also ensure that our mistakes do not cascade to the other states that traditionally adopt California regulations.

5.) Economic development: Delaying the ban will likely cancel or postpone every prospective ethanol development project in California. It will undercut legislative efforts – specifically Senate Bill 87-XX – to capture the economic benefits of public investment in biomass ethanol production. The CEC report " Costs and Benefits of a Biomass-to-Ethanol Production Industry in California" demonstrates that a relatively small 200 million gallons per year California biomass ethanol industry would result in statewide economic benefits of $1 billion over a 20-year period. Another CEC report estimates that California has enough " wastes and residues" alone to produce up to 3.9 billion gallons of biomass ethanol per year – enough to displace a third of California's transportation sector oil consumption. In addition, private investors and farmers stand ready to invest additional millions of dollars in California biofuels.

It is time for the State of California to truly address its fuel supply issues. Awaiting completion of oil pipelines, permitting ongoing MTBE use, and pursuing policy initiatives that undercut truly sustainable energy development projects is a disservice to California residents even in the near term. It will commit the state to even more perilous dependence on foreign oil, exacerbated MTBE cleanup costs, increased global warming emissions and ongoing gasoline supply issues. REAP fully supports efforts to protect California consumers from pump price spikes, but not at the needless expense of drinking water and sustainable economic development.

We appreciate your efforts to investigate strategies to reduce petroleum use. REAP would like to provide any assistance we can to make that vision a reality.

Sincerely,

RBColeman

Brooke Coleman
Director, Renewable Energy Action Project (REAP)
415.336.2321

Climate Solutions

REAP

Renewable Energy Action Project

Bluewater Network
Environmental & Energy Study Institute
Kinergy Resources
West Coast People's Energy Co-op
Institute for Local Self-Reliance
Institute for Agriculture & Trade Policy
California Renewable Fuels Partnership
Masada Resource Group
The Brower Fund
General Biomass Company
Oregon Environmental Council
California Farmers Union
The Minnesota Project
Plumas Corporation
Oceanic Resource Foundation
County of Ventura Public Works Department
Tides Foundation
Illinois Student Environmental Network (ISEN)
Waterkeeper Alliance
Save Our Shores
International Marine Mammal Project
Clean Energy Now (Greenpeace)
Kettle Range Conservation Group
Cook Inlet Keeper
New River Foundation
Earth Island Journal
Waste Action Project
Pacific Biodiversity Institute
Mangrove Action Project
Citizens Committee to Complete the Refuge
Northwoods Conservation Association

41 Freelon Street, San Francisco, CA 94107

122 C Street, NW Suite 700, Washington, DC 20001

Pat Perez - Possible Impacts of MTBE Phase Out on Gasoline Supplies

From: Tracy Hemmeter <themmeter@valleywater.org>
To: "'pperez@energy.state.ca.us'" <pperez@energy.state.ca.us>
Date: 2/28/02 2:19 PM
Subject: Possible Impacts of MTBE Phase Out on Gasoline Supplies

Attached is an electronic copy of the Santa Clara Valley Water District's comments on the possible impacts of the MTBE phase out on gasoline supplies. The signed hard copy is has been sent through US mail.

<<FL0225k.doc>>

Tracy Hemmeter
Groundwater Management Unit
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Phone: 408-265-2607, ext. 2647
FAX: 408-978-0156
email: themmeter@valleywater.org

February 26, 2002

California Energy Commission
Attention: Pat Perez
1516 Ninth Street, MS 23
Sacramento, CA 95814

Ladies and Gentlemen:

Subject: Possible Impacts of Methyl tert-Butyl Ether Phase Out on Gasoline Supplies

The Santa Clara Valley Water District (District) appreciates the opportunity to provide comments on the Stillwater Associates' draft report on the "MTBE Phase Out in California" study. The District provides wholesale water supply for the nearly 1.7 million residents of Santa Clara County. Methyl tert-Butyl Ether (MtBE) has been detected in our drinking water supply reservoirs, imported water supplies, and two public water supply wells. In addition, MtBE has been detected in groundwater at more than 400 leaking underground storage tanks (UST) sites in the county, at concentrations as high as several million parts per billion. In response to this widespread groundwater contamination, the District Board of Directors adopted a resolution urging a prohibition on the use of MtBE and other ether-oxygenates in gasoline in February 1998. We continue to be very concerned about the additional water quality impacts that may occur between now and the time MtBE is removed from gasoline. We believe the California Energy Commission should make every effort to support and encourage the early phase out of MtBE from gasoline.

There are thousands of UST facilities in California that dispense gasoline containing MtBE that may be subject to undetected releases and have not been investigated. These are in addition to the known sites with MtBE contamination in groundwater. The District is extremely concerned that MtBE continues to be released at UST facilities. We have completed several studies on the occurrence of MtBE and other petroleum hydrocarbons at sites with new or upgraded UST systems. As part of one study, we collected soil and groundwater samples on or adjacent to 28 sites with new or upgraded underground storage tank systems. MtBE was detected in groundwater at 13 of the 28 sites. In a recent pilot study of groundwater monitoring at an additional 30 operating gasoline stations, MtBE was detected at more than 60 percent of the sites. The State Water Resources Control Board Field Based Research Project on Enhanced Leak Detection recently found evidence of a release at 60 percent of the UST systems that were tested. Many of these releases are believed to be vapor releases, which can be a significant release mechanism for gasoline containing MtBE. The MtBE vapor release pathway was the cause of a release that resulted in 2,000 pounds of MtBE in soil and groundwater at an operating station in San Jose, which has been implicated in a water supply well impact. A complete list of references for the above studies is attached for your use.

There is currently no statewide program to identify and clean up the legacy of MtBE contamination from previously undetected releases at operating UST facilities (possibly 40 to 60 percent) that are not currently in the state's UST cleanup program. The evidence of continuing and ongoing spills and

releases at operating UST facilities is persuasive and should be viewed as a very significant threat to the state's water resources. This threat can only be minimized by the removal of MtBE from gasoline.

The District supports the current MtBE phase out date of December 31, 2002. The State of California needs to protect its natural resources. Each gasoline facility with MtBE is a threat to water resources and drinking water sources due to the significant potential for spills and undetected releases and MtBE=s unique characteristics. The District, along with agencies and organizations across the state, has expended considerable resources to prevent and manage contamination problems associated with MtBE. We understand and appreciate the economic, technical and regulatory issues associated with the MtBE phase out. However, the continuing threat to our water resources and the costs to cleanup MtBE contamination dictate an aggressive phase schedule. We urge you to continue with the immediate and complete removal of MtBE from gasoline in California.

Thank you for the opportunity to provide these comments. If you have any questions or would like more information on the District=s effort to manage the MtBE problem, please call Ms. Tracy Hemmeter at (408) 265-2607, extension 2647.

Sincerely,

ORIGINAL SIGNED BY

Stanley M. Williams
Chief Executive Officer

Attachment: List of References Related to MtBE Occurrence at Operating Gasoline Stations

cc: Ms. Susan Kennedy
Deputy Chief of Staff for Cabinet Affairs
Office of the Governor
State Capitol
Sacramento, CA 95814

W. Wadlow, K. Whitman, S. Fitts, R. Davis, J. Crowley, B. Ahmadi, T. Hemmeter

JC:MF:FL0225k

LIST OF REFERENCES RELATED TO MtBE OCCURRENCE AT OPERATING GASOLINE STATIONS

San Diego Regional Water Quality Control Board. February 2002. Groundwater investigations of MtBE Releases at Operating Gas Stations in the Temecula Valley Area. Presented at the 4th Annual CAL CUPA Conference Including the Annual UST Conference, February 4-8, 2002.
http://www.calcupa.net/conference/2002/presentations/CUPA.pdf

Santa Clara Valley Water District. February 2002. Evaluation of MtBE Occurrence at Operating Gasoline UST Facilities in Santa Clara County—Preliminary Findings. Presented at the 4th Annual CAL CUPA Conference Including the Annual UST Conference, February 4-8, 2002.
http://www.scvwd.dst.ca.us/wtrqual/Lustop/home.htm

State Water Resources Control Board. January 2002. Field-Based Research (FBR) Project, Status Report I (Sacramento and Yolo Counties). Presented at the 4th Annual CAL CUPA Conference Including the Annual UST Conference, February 4-8, 2002.

United States Government Accounting Office. May 2001. ENVIRONMENTAL PROTECTION: Improved Inspections and Enforcement Would Better Ensure the Safety of Underground Storage Tanks.

Thomas M. Young and Jennifer Nakayama-Curry, et al., March 2001. Field Verification of the Performance of Release Detection Methods for Underground Storage Tank Systems.
http://cee.engr.ucdavis.edu/faculty/young/ldstudy/LDfinal.pdf

Santa Clara Valley Water District. May 2000. An Evaluation of MtBE Occurrence at Fuel Leak Sites with Operating Gasoline USTs.
http://www.scvwd.dst.ca.us/wtrqual/factMtBE.htm

The California MtBE Research Partnership. September 1999. Survey of Current UST Management and Operation Practices.
http://www.ocwd.com/NWRI

LFR Levine-Fricke. June 1999. Groundwater Vulnerability Pilot Study, Investigation of MtBE occurrence associated with Operating UST systems, prepared for Santa Clara Valley Water District.
http://www.scvwd.dst.ca.us/wtrqual/factMtBE.htm

Report of the State Water Resources Control Board (SWRCB) Advisory Panel, UST Team 2 Report. January 1999. Leak History of New and Upgraded UST Systems: Upgraded UST release Site Evaluation Case Studies.
http://www.swrcb.ca.gov/cwphome/ust/advisory_panel/advisory_panel.htm

State Water Resources Control Board. January 1998. Are Leak Detection Methods Effective in Finding Leaks in Underground Storage Tank Systems? (Leaking Site Survey Report).
http://www.swrcb.ca.gov/~cwphome/ust/leak_reports/Index.htm

Pat Perez - Response to Stillwater Draft

From: Tony Hoff <bhoff@ShoreTerminals.com>
To: '"pperez@energy.state.ca.us"' <pperez@energy.state.ca.us>
Date: 2/28/02 9:39 PM
Subject: Response to Stillwater Draft

Hello Pat. Attached is a letter responding to the Stillwater Draft Report on MTBE Phase-Out in California from our perspective as an operator of large bulk liquid terminals in California:

<<Pat Perez Letter 02-28-02.doc>>

ST
SERVICES
Shore Terminals LLC
A KANEB COMPANY

February 28, 2002

Mr. Pat R. Perez
Manager
Fuel Supply and Demand Office
California Energy Commission
1516 Ninth Street, MS 23
Sacramento, CA 95814-5504

RE: **Response to Stillwater Draft Report on MTBE Phase-Out in California**

Dear Mr. Perez:

Thank you for the opportunity to comment on concepts set forth in the Stillwater Associates Draft Report on anticipated impacts of MTBE Phase-Out in California ("Draft"). The Draft bases its conclusions in large part upon the inability of California's storage and transportation infrastructure to handle volumes of ethanol and other blend components which will be required to replace MTBE when it is phased out. We believe that California's infrastructure can quickly, and at low cost, handle the required volumes of ethanol and other components.

ST Services owns and operates 50 bulk liquids terminals in the US and UK, and just today closed on the acquisition of a 10.5 million barrel terminal in the Caribbean and a 7 million barrel terminal in Nova Scotia. ST has been unloading ethanol rail cars in California for 15 years, and operates 6.5 million barrels of terminal tankage in the Bay Area. The following are some facts and observations that offset some of the assumptions made in the Draft.

1) Ethanol Storage, Rail Offloading, and Truck Loading. The ST terminal in Crockett, CA (Selby Terminal) currently has 25.5 million gallons of storage in ethanol service, and could have an additional 16 million gallons in ethanol service by the end of 2002. The additional tankage will be made available from the conversion of 8,400,000 gallons of MTBE storage to ethanol, and from efficiencies gained in converting an additional 8,000,000 gallons currently in separate gasoline and distillate storage held independently by refiners into a commingled ethanol system.

We currently have the capability to unload about 682,500 gallons of ethanol per day from railroad tank cars, and have achieve this level for sustained periods. About half this volume is transshipped via barge to Los Angeles. Maintaining this level of rail car unloading on an ongoing basis is difficult for the railroad

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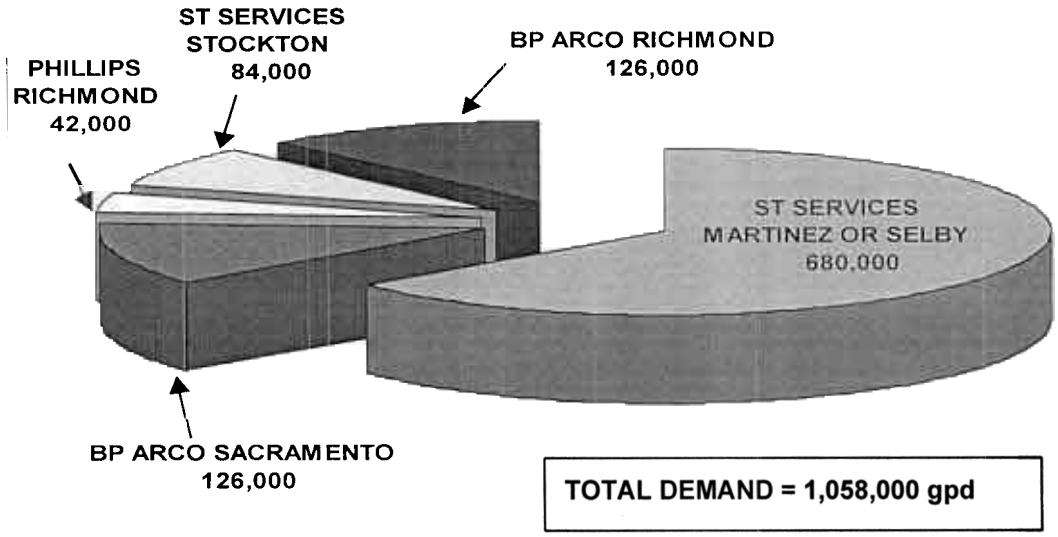
due to track congestion. Therefore, we are starting a project that will improve the handling at our rail facility to eliminate the problems caused by track congestion. This project includes increased pumping capacity from the rail unloading facilities to the tanks, and constructing additional unloading and storage track space. We are implementing this project in conjunction with Union Pacific Railroad, keeping the capital investment for each company to a reasonable level.

We currently have the capability to load about 400,000 gallons of ethanol per day to tank trucks, and are starting a project to increase this capacity to about 800,000 gallons per day.

The combination of rail unloading, storage, and truck loading achieved at this facility by these fairly modest capital improvements will allow the terminal to easily handle the 682,500 gallons per day of ethanol expected for this terminal when MTBE is eliminated. The chart below shows how other facilities in Northern California will handle the balance of the 1,058,000 gallon per day demand for the area. The terminals are either able to handle these volumes now, or have projects in place to accommodate the storage volume and rail capabilities.

Ethanol Supply Terminals -- Northern California
(in Gallons per Day)



In addition to these existing facilities, ST Services, US Development Group, and Burlington Northern Santa Fe Railway are exploring the possibility of providing a new rail facility in Martinez with the capability to unload 100 ethanol rail cars ("unit train") in 24 hours. This ethanol would be pumped via a new pipeline to tanks at the ST terminal a mile away on Waterfront Road in Martinez, and redelivered to trucks via the terminal's truck loading facilities. These truck facilities are currently under utilized and can handle the entire anticipated outbound truck volume for Northern California.

Both the ST Crockett and Martinez terminals have the capability to receive very large quantities of ethanol by ship. Our customers currently bring to Northern California large cargoes of US Midwest ethanol via the US Gulf Coast, and also foreign ethanol, if the economics work better than domestic

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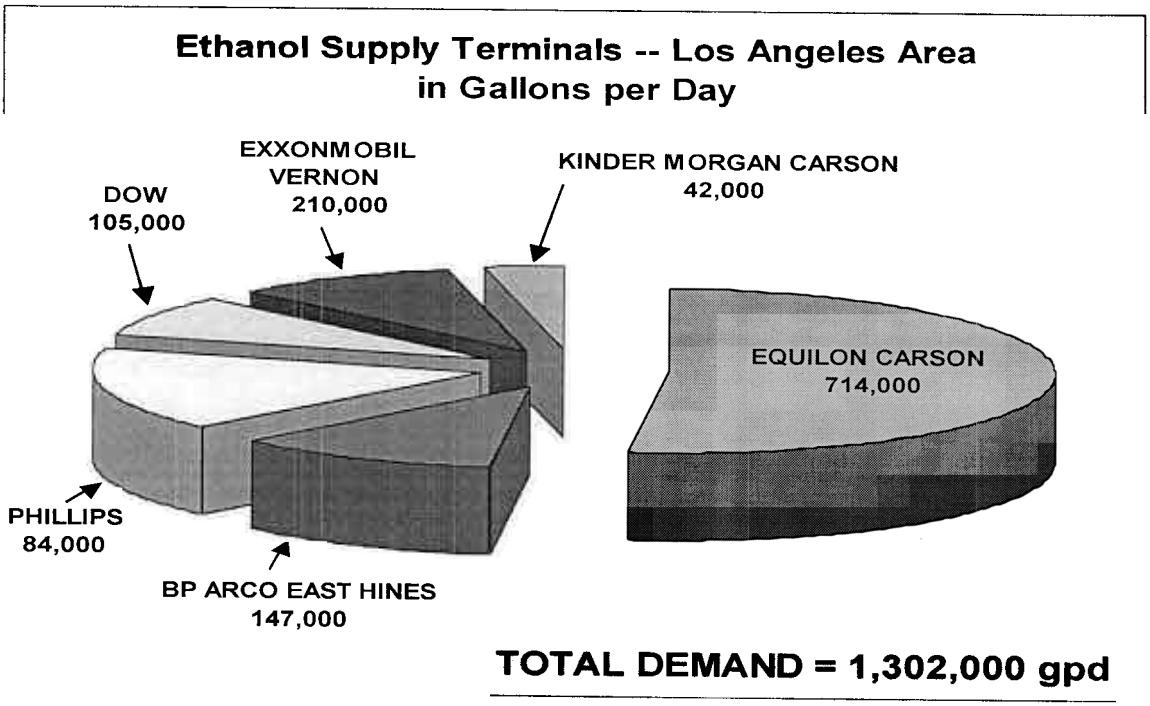
sources. This capability provides the competition required to prevent ethanol product and transportation prices from getting out of hand.

ST's terminal in Stockton currently receives about 55,000 gallons a day of ethanol by rail car into a large storage tank where it is redelivered to trucks of ethanol-blended gasoline and neat ethanol. Total capacity at this facility for rail car offloading and truck loading is about 300,000 gallons per day.

In Southern California, similar projects are commencing that will handle the volumes of ethanol required there. Modifications to a rail yard in Los Angeles will enable unit train efficiency. The following chart shows how ethanol can be handled in Los Angeles. Similar to the Bay Area, the fairly moderate costs of these projects are easily justified by the volumes of ethanol that will move through these systems.



Given all of these capabilities, we believe that inbound ethanol will have no logistical constraints in Northern and Southern California.

2) Storage and Handling of Imported Blend Components. The draft mentions the supposed difficulty in finding alkylates, "nearBOBs", and other blend components, and the difficulty in finding import tankage for these components. The refining product buyers who I communicate with every day tell me that they are not asleep at the helm, that they know what their blending programs look like after MTBE is gone, and that they are lining up sources of these components. They explain that it is not in their best interest to explain to a consultant such as Stillwater how their programs will work. Some of these components will go through the refineries and some will be imported into third-party terminals.

Tankage space in both places will come from a higher demand for utilization by these components. We have seen an example of this at one of our Bay Area terminals. In 2001, about 29 million gallons of storage was used for Jet A arbitrage trading and other distillate import and blending. These activities commanded about $0.32 per barrel per month on average for tank space. A higher demand for gasoline

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components in late 2001 and early 2002 converted all of this storage to imported gasoline "nearBOB" and other gasoline components. This activity commanded about $0.44 per barrel per month for the tank space. So, for a premium of $0.12 per barrel, or less than $0.003 per gallon, tank space was converted from a less value-added service to gasoline importation. We believe this occurrence across all the various refinery-owned and independent terminals will allow imports of components which will prevent the severe shortfalls predicted in the Draft at a reasonable cost to the importers.

Pat, we strongly urge the California Energy Commission to stay with the plan to phase out MTBE by the end of 2002. The infrastructure in California can handle both the ethanol and other required components. The market is the best mechanism to bring equilibrium to the system. The sooner we begin allowing the market to provide channels for the components required to replace MTBE, the less competition we'll have from other areas of the country for these components and the infrastructure.

Thank you for your time.

Sincerely,

Tony Hoff

Vice President, Marketing

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SIERRA
ECONOMIC
DEVELOPMENT
DISTRICT

February 20, 2002

California Energy Commission
1516 Ninth Street, MS 23
Sacramento, CA 95814

Attention: Debbie Jones for Pat Perez: via fax (916) 654-4676

Re: MTBE Phase-Out – "Stillwater Associates" Report Comments

NEVADA, PLACER,
AND SIERRA
COUNTIES

The Sierra Economic Development District (SEDD) is concerned that extending the use of MTBE will have significant environmental impacts on California's water systems. Northern California is the source of the drinking water supplies for most of the state. At the very least, we need your support in maintaining our water quality by ensuring that the gasoline supply of this area is MTBE-free.

SEDD also supports the development of the ethanol industry in California and has been actively facilitating a regional (Placer/Yolo County) ethanol project including completion of a feasibility analysis and business plan. In-state ethanol production can and will increase supplies in California with a clean renewable fuel source, create jobs, stimulate rural economies, return billions of dollars to the state's economy, while also providing for improved water quality, air quality, and forest health.

California agriculture is poised to rise to the challenge of the MTBE phase out by joining together and producing ethanol within the state. This is a great opportunity for California farmers and will provide value-added benefits to the state's agriculture industry, encouraging other regional ethanol production facilities that can utilize a diversity of feedstocks such as agricultural products and by-product materials, woody biomass derived from the wildfire fuels reduction and forest thinning practices, and municipal solid wastes.

We urge you not to move the deadline for phasing out MTBE. Extending the current deadline will have a negative impact to our water systems, severely hamper the development of the ethanol industry in this state, and delay a much-needed economic boost to agricultural and forest based communities within our great state.

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823-4142

Betty Riley
President

South Tahoe
Public Utility District

1275 Meadow Crest Drive • South Lake Tahoe • CA 96150
Phone 530 544-6474 • Fax 530 541-0614

February 25, 2002

The Honorable Gray Davis
Governor of California
State Capitol
Sacramento, CA 95814

Dear Governor Davis:

I write on behalf of the South Tahoe Public Utility District urging you, in the strongest possible manner, to remain resolute in removing methyl tertiary butyl ether (MTBE) from California's gasoline supplies on or before December 31, 2002. You have been a strong advocate for protecting our precious drinking water supplies and the District appreciates the special status you gave Lake Tahoe in your executive order. However, each additional day MTBE remains in our gasoline is another day our drinking water supplies are held hostage.

As a public water agency that has seen a pristine aquifer and water distribution system ravaged by a chemical that has little or no air quality benefits in modern engines, I cannot stress too strongly how quickly and insidiously this chemical can contaminate. Time is of the essence, and giving the oil industry ant more time places more and more drinking water sources at risk.

The District looks forward to your continued leadership in water quality issues and specifically in MTBE removal. Please make the decision that will continue to protect our drinking water supplies. Californian's should not have to ransom their drinking water in order to keep gasoline prices low. Should you or your staff have any questions please feel free to call me at (530) 541-5255 or Dennis Cocking, District Information Officer, at (530) 544-6474 ext. 208.

Best regards,

Duane Wallace

Duane Wallace
President, Board of Directors

cc: Senator Rico Oller
Assemblyman Tim Leslie
Pat Perez, California Energy Commission